

## Composting Facility:

# Composting Poultry Mortality

Alabama Job Sheet No. AL317



## Definition

Composting poultry mortality is a process which biologically stabilizes the mortalities from a poultry operation, making them suitable for disposal by land application. It uses a simple mixture of dry poultry manure (litter), poultry carcasses, and a bulking agent or aeration medium such as wheat straw, peanut hulls, soybean hulls, etc. Only enough water is added to keep the material moist; the mixture should never be saturated. The following table provides a recommended recipe for composting poultry.

### Proportions of Materials Needed in Composting

Ingredients	Volumes	Weights
Poultry	1	1
Straw/Peanut Hulls*	0-1.2	0-0.4
Manure (Cake)**	4-8	2-4
Water***	0-0.6	0-1

\* Composting can be accomplished without the bulking agent but the decomposition of birds may be less complete.

\*\* Using a higher proportion of manure results in a better product.

\*\*\*The mixture should be moist but not saturated. The amount of water needed depends upon the size of the birds and the moisture content of the litter.

Example: (Proportion by weight - 1:0.2:2.5:0.5)

400 lbs. dead chickens (about 100 mature birds) = 1 part

80 lbs. (4 cf) straw = 0.2 of 1 part

1000 lbs. (33 cf) manure (litter) = 2.5 parts

200 lbs. (25 gal.) water = 0.5 of 1 part

## Operation and Maintenance

### Loading the Primary Composter

Materials should be loaded into primary bins according to the following schedule:

1. Place 1-foot of dry manure on the floor of the bin. (This manure is not part of the recipe.)
2. Add a 6-inch layer of straw, peanut hulls, or other acceptable aeration medium (bulking agent). Note: Some poultry litter has enough coarse material to aerate itself without adding any bulking agent, so the addition of a bulking agent is not needed.
3. Add a layer of carcasses. Do not mound the birds. Use a rake to spread the birds in a single layer. Keep birds at least 6 inches from the side walls.
4. Proper water content is important to success. Add water to each layer of carcasses as needed to ensure the mixture is damp. When water is correctly applied the litter forms a moist ball when squeezed by hand, with no free water present.
5. Cover each layer of birds with litter. Several layers of bulking agent, birds, and manure may be needed during a single day when birds reach maturity or when mortality is higher than normal. A 5 foot high bin may hold 4 layers of birds, depending on the size of the birds and the loading rate.
6. Insure that all birds and body parts are covered with at least 6 inches of litter at all times.
7. When the last layer of birds is added to a bin, cap the pile with an extra layer of litter. The extra layer will insulate the pile and help prevent scavenging animals from digging into the top of the pile.

### Monitoring Temperatures

After a primary bin is filled, temperatures in the bin should be monitored daily. A 36-inch probe type thermometer is ideal for this purpose.

Temperatures should reach 130°F to 160°F in 7 to 10 days after capping. Temperatures should then exceed 130°F for 5 days. This will kill fly larvae and most harmful bacteria and viruses. If temperatures exceed 190°F, remove the material from the composting bin (see Alabama NRCS guide sheet, Preventing Fires in Litter Storage Structures, No. AL313). If temperatures do not reach 130°F, try--

- ❑ adjusting the water content (see Loading the Primary Composter, Item 4.)
- ❑ changing the amount and/or type of the bulking agent (do not use grasses or other material that will prevent aeration in the pile)
- ❑ changing the ratio of birds to litter and insure that the layering technique is correct

### Treatment in the Secondary Bin

Once temperatures peak in the primary bin and begin dropping, it is time to move the material to the secondary bin. Moving the material aerates the mixture and revives the bacteria, allowing them to begin another cycle of heating. Temperatures in the secondary bin should rise again and peak in about 7 days.

Proper composting in the primary bin should eliminate all raw chicken parts. However, if raw chicken parts are exposed when moving to the secondary bin, they shall be covered with at least 6 inches of litter.

The original volume at the start of primary bin treatment should be reduced by 20 to 30 percent after completion of secondary bin composting.

### Storing the Compost

Finished compost can remain in the secondary bin until it is ready to be land applied. The final product should be allowed to “rest” for about 30 days before spreading. If the secondary bin must be emptied prior to land application, the compost should remain covered. Compost should NOT be stored with dry manure to reduce the risk of fire!

### Single Stage Composting

Load the single stage composter the same as the primary bin of the two-stage process. A probe type thermometer should be used to monitor temperatures daily to ensure the mix reaches 130°F. See guidance under Monitoring Temperatures if the composter does not reach 130°F. Additional aeration with a hand tool may also be required. If compost is recycled, it must be mixed with at least one part litter per one part compost. Using recycled compost again is not recommended

because the resulting compost can become consolidated and have less air voids.

Another problem can occur when excessive amounts of water enter the composter through wind blown rain. If this potential exists, the bins will need to be protected against rain.

After temperatures drop, which should occur in 7 to 10 days, the compost can be moved to storage. Otherwise, allow the compost to remain in the bin a **minimum** of one month after it has been capped before spreading onto the land.

### Using “Hot Litter” for Composting

“Hot litter” refers to litter in which a high population of bacteria is maintained. Litter fresh from a poultry house typically contains billions of bacteria per pound of litter. In six weeks, this number can decline to hundreds per pound if the bacteria are not provided water and air. Using “hot litter” will result in faster, more complete composting.

A convenient way to keep fresh litter “hot” is to maintain a 6- to 10-day supply in a pile which is kept moist and turned on a daily basis. As a portion of the “hot litter” is removed to operate the primary bins, an equal volume of older litter is added to the “hot” pile, water is added, and the pile turned for mixing and aerating.

This method allows all the required water to be added to the “hot litter” pile, and will maintain a bacteria-rich litter supply with an initial temperature of 120°F or more. Proper loading of the primary cells will be easier, and the recipe will reach a higher temperature faster if “hot litter” is used.

### Land Application of the Compost

The nutrient content of the finished compost can vary significantly from one facility to another. Factors that affect nutrient content include age of the litter added, type of bulking agent (straw, peanut hulls, etc.), temperatures achieved during composting, etc. Therefore, each grower should have a sample of the compost analyzed for nitrogen, phosphorus, and potassium. NRCS personnel can assist in the interpretation of lab data.

If lab data is not obtained, the following general guidelines may be used to estimate the plant available nutrient content of the compost:

Nitrogen (N): 43 lbs/ton  
Phosphorus ( $P_2O_5$ ): 58 lbs/ton  
Potassium ( $K_2O$ ): 45 lbs/ton

If lab data is used, assume that 30 percent of the total nitrogen will be lost to the atmosphere after it is spread on the land. Compost should be applied according to agronomic rates for specific cropping systems as

described in Alabama NRCS conservation practice standard, Nutrient Management, Code 590.

Since dead bird compost is relatively moist as compared to dry broiler litter, some adjustment may be needed to spreading equipment normally used for broiler litter. Straw used in the process may adversely affect some spreaders.

### Maintaining the Composter

The compost structure should be inspected each time a portion of the facility is emptied. Replace any wooden parts or hardware as needed. Roofed structures should be examined for structural integrity.

### Cautions

1. Composting dead poultry is not for everyone! Although the owner will typically spend only 20 minutes per day in loading the bins for a 60,000-bird production facility, careful attention is needed to ensure these guidelines are followed. Failure to manage the system will result in an odorous operation that may attract flies, buzzards, and other vermin.

2. The composter is designed for normal mortality from the poultry facility. Although NRCS-designed composters have successfully accommodated above-average losses, the system is not designed for catastrophic losses resulting from excessive heat, collapse of buildings, loss from disease, etc. For catastrophic losses, see Alabama NRCS guide sheet, Emergency Disposal of Dead Animals, No. AL316.
3. Larger birds (6 pounds and above) may require extra care in composting. Water may need to be added during the process to maintain dampness, and a third stage of composting may be needed to produce an acceptable product.

### **References**

NRCS AL Conservation Practice Standards  
[Composting Facility - Code 317](#)  
[Nutrient Management - Code 590](#)

Alabama Job Sheets  
Emergency Disposal of Dead Animals – AL316  
[Preventing Fires in Litter Storage Structures - AL313](#)

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## COMPOSTING POULTRY MORTALITY WORKSHEET

Land User: \_\_\_\_\_ County: \_\_\_\_\_ Date: \_\_\_\_\_

Farm No.: \_\_\_\_\_ Tract No.: \_\_\_\_\_ Assisted By: \_\_\_\_\_

Annual mortality from poultry operation: \_\_\_\_\_ Tons

Estimated amount of compost produced annually: \_\_\_\_\_ Bins \_\_\_\_\_ Tons \_\_\_\_\_ Cubic feet

Type of carbonaceous material to be used in composter: Poultry litter \_\_\_\_\_ Cake \_\_\_\_\_

Other \_\_\_\_\_

Estimated amount of carbonaceous material required annually: \_\_\_\_\_ Tons

Method of applying water to the compost mix: \_\_\_\_\_

Are there provisions for keeping a "hot litter" pile? Yes \_\_\_\_\_ No \_\_\_\_\_

Method of handling excess mortalities (See Job Sheet AL316 – Emergency Disposal of Dead Animals):

Burial \_\_\_\_\_ Incineration \_\_\_\_\_ Rendering \_\_\_\_\_ Other \_\_\_\_\_

If by burial, is the burial site preapproved: Yes \_\_\_\_\_ No \_\_\_\_\_

Method for monitoring temperature: \_\_\_\_\_ in. probe type thermometer Other \_\_\_\_\_